Remarks

1. With regard to rejection of the Applicant's Claims based on Rule 35 U. S. C. 103 (a), the Applicant respectfully states that his Claims cannot be rejected by this Rule. The Applicant invention is based on entirely different concepts, purposes, procedures, and apparatuses compared to the prior art. As a result, the prior art cannot lead to his invention or make his invention obvious.

2. With regard to ¶ 2 of the Office action, Applicant respectfully states that Claims 1-15 cannot be rejected under 35 USC § 103 (a) as being unpatentable over Welsh et al. in view of Fujimoto et al. The following discussions and arguments will show that the combined teachings of Fujimoto et al. and Welsh et al. cannot possibly lead a person having ordinary skill in the art to the Applicant's invention.

The differences between the Fujimoto et al's invention and the Applicant's invention are discussed first.

Fujimoto et al's and the Application's inventions are based on entirely different concepts, procedures, and entirely different apparatuses. The apparent similarities in the two inventions are the usage of heater and controlling the temperature of the target samples. Before showing that these apparent similarities are patentably distinct from each other, some of the major and readily distinguishable differences between the two inventions are discussed.

2.1 Fujimoto et al. propose laser fusion for production of isotopes (12, 14, and 16 of FIG 1). That is, they suggest bombarding the sample with a laser whereas Applicant uses a beam of charged particles. These two types of interactions are completely separate from one another and cannot be compared.

2.2 Fujimoto et al. do not have a target body. They have an "irradiation region" under the vacuum and spray the sample as a gas jet into the irradiation region (32 of FIG 1). The Applicant has a target body and due to high concentration of the sample in the target

body, the target body is under very high pressure, as opposed to being under the vacuum.

2.3 They have to continuously supply the target sample into the "irradiation region" by spraying the sample in the form of a gas jet (22, 28 of FIG 1), whereas in the Applicant case the sample is loaded initially as water, and then is converted to steam. The steam remains confined in the target body during the entire bombardment.

The apparent similarities between the two inventions are the usage of heaters and controlling the temperature of the samples. In reality, the heaters are used for different purposes, and installed on two different devices. Controlling the temperature of the samples is also for totally different reasons.

The heater in Fujimoto et al. is installed on the "source supply" in order to spray the sample as a gas jet into the irradiation region. In the Applicant case, the heater is installed in the target body. Applicant does not have a "source supply" nearly similar to what they have. In the Applicant's case, a few droplets of cold water from a transfer line is loaded in the target body.

Fujimoto et al. control the sample temperature in hopes of controlling the spray speed of particles in the "irradiation region", and for reducing the size of the clusters that interact with the laser. They claim, and I quote "each cluster consisting of about hundred thousand molecules" (Par 0049, lines 10-20). The size of the clusters, or the speed of the sample do not relate in any way to the Applicant's inventions. Applicant controls the sample temperature to limit the range of the protons in the target, and to prevent the protons from striking the back of the target body.

In view of the above, it is seen that there are no similarities between the concepts, and purposes of the two inventions for heating and controlling the sample temperatures. As a result one invention cannot lead to the other invention. Subsequently, the Applicant claims cannot be rejected based on Rule USC 103 (a) due to combination of Welsh et al. and Fujimoto et al.

3. Before responding to ¶ 3 of the Office action regarding Claims 1, 9, 13, and 6, first the reason for similarities between some of the statements in Welsh et al. and the current application is discussed.

Production of radioisotopes requires bombarding a target sample with a beam of charged particles, (or a beam of neutrons or gamma rays). This statement, which is very broad, holds true in any target system that is used to produce radioisotopes. As a result, in any patented target, or a patent application for a new target, there are statements very similar to each other that are used to convey the broad method of producing isotopes. These statements use terms such as; a beam of charged particle, a target sample to be bombarded by the beam of charged particles, an enclosure to house the target sample, and placing the target sample in line with the beam. Clearly, these terms by themselves should not be used to reject claims in a new application simply because the prior art also uses similar terms.

For example, the following issued US patents cited by Welsh et al. 2,579,243, 5,037,602 5,280,505 and 5,468,355, at one point or another, use the above noted terms to describe their respected target systems. Yet these and very many other patented target systems that shared similar descriptions were patentably distinct from one another.

Regarding **independent Claims 1, 9, and 13, and dependant Claim 6**, referred to in ¶ 3 of the Office action, these claims are patentably distinct from Welsh et al. for the following reasons:

Independent Claim 1 is patentably distinct from Welsh et al. by

"means mounted within the body for heating, when desired, the material sample to an elevated temperature" and by

"means associated with the body for preventing the body from exceeding a preselected temperature".

Independent Claim 9 is patentably distinct from Welsh et al. by

"means for generating a magnetic field parallel to the longitudinal axis of the chamber".

Independent Claim 13 is patentably distinct from Welsh et al. by

"a second body attachable to the first body adjacent the entrance end of the chamber and including at least one fluid-conducting passageway, and the associated means further includes means for directing a cooling fluid through the at least one fluid-conducting passageway for purposes of cooling the first body. "

The function of the second body is to keep the target body (the first body) at a predetermined temperature during the operation when the target sample is steam. The target temperature has to be high enough to prevent excessive condensation of steam, but lower than the value at which the steam pressure can rupture the thin foil. That is, the second body controls the temperature of the first body for a steady operation. This is achieved by the location of the fluid–conducting passageway in the second body. Welsh et al. do not have a second body and do not have the above temperature constrain for their target sample. Welsh et al.'s have a solid target (nickel plated target).

At first glance it appears that **Dependent Claim 6** partially overlaps with Welsh et al.'s means of cooling their target system. But the fact is Welsh et al have only a "cooling head" (their FIG 3B) and lack any method for cooling their target sample. They use a solid target, and place their target in a target holder, which is under the vacuum. After the bombardment, the target is remotely transferred outside the target holder. Since their target is in a solid form (Lines 3 –6 of Abstract) that needed to be loaded and unloaded automatically there is no way of cooling the target. In contrast to the Applicant's invention, Welsh et al cannot and do not suggest any direct or efficient method cooling their target. The Applicant's target sample is either gas or steam that are confined in the chamber making the target body. The target samples are cooled directly by cooling the body.

Dependent Claim 6 is also directly related to its parents Claims 5, 4, and 1. It should be allowed since independent Claim 1 and dependant Claims 5, and 4, as noted before, should be allowed.

4. With regard to Claims 1-5, and 7-15, ¶ 4 of the Office Action, as pointed out by the Examiner, Welsh et al. fail to disclose means of heating the body and controlling its temperature. However, as shown in No. 2 above, Fujimoto et al. and Applicant use different apparatuses, and their concepts, and procedures of cooling and controlling sample temperatures are based on entirely different reasons.

The term "a thin file exit for charged particles" in Line 3 of the 2nd paragraph of ¶ 4 of the Office Action should perhaps read "a thin foil exit for charged particles". Applicant acknowledges that the Examiner is correct in pointing out that usage of a thin foil in a target system is a well-known technology. The reason for introducing the thin foil in Claims 8, 12, and 15 was to disclose the thin wire in relation to the thin foil in these claims. As described in Claims 8, 12, and 15, the thin wire is used for structural support of the foil. Usage of a thin wire is quite new and the purpose of the thin wire, as explained in Line 10-13 of the abstract, is to roughly double the strength of the thin foil against internal target pressure. During the operation, the target pressure increases to the point that can rupture the thin foil. This is a serious problem, and is avoided by the noted method of support.

In the second paragraph of ¶ 4 of the Office action a statement by Welsh et al. was incorrectly attributed to generation of a magnetic field in the target chamber of the current invention, Claims 9-10 of the current invention. The statement by Welsh et al. is about on-site production of radionuclides. This statement, however, has nothing to do with generation of a magnetic field in the target. The term "on-site" refers to the site where the patients are kept and to whom radionuclides are going to be administered. Since some radionuclides have short half-lives, if they are produced on-site they can be used immediately before they decay. That is, before they convert into stable substances. Generation of a magnetic filed in the chamber, on the other hand, is for preventing density depression and instabilities in the target chamber that can occur when increasing the beam power. These issues are explained in the specification and the last 3 lines of the abstract. Using a magnetic field to suppress instabilities and density depression is a new method and is a very significant technology. This new method, and as a

result, independent Claim 9 and dependant Claim 10, could not possibly be related to the teaching of Welsh et al. or other prior art. Skilled authors in targetry are mostly chemists. Taking advantages of magnetic or electric fields are not their strong points.

5. With regard to ¶ 5 of the Office action, the Applicant sincerely appreciates receiving a copy Wieland et al.'s invention.

Conclusion

6. In view of the forgoing, the combined methods and apparatuses of Welch et al. and Fujimoto et al. cannot make the Applicant's invention obvious to one having ordinary skill at the time invention was made. Subsequently, Claims 1-15 cannot be rejected under 35 USC § 103 (a) as being unpatentable over Welsh et al. in view of Fujimoto et al.

Applicant has also shown that independent Claims 1, 9, and 13 are patentably distinct from Welsh et al.

For all of the above reasons, the Applicant respectfully request reconsideration and asks the Examiner to allow Claims 1-15 of his invention.

Respectfully submitted,

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I hereby certify that this paper is faxed to the USPTO at 1-703-872-9306 on this date

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